Remarks / Arguments

Support For Amendments

Claims 81 and 91 are amended to correct terminology used when referring to a trademark. Specifically, the "®" has been removed and the corresponding trademarked words have been capitalized.

Claims 82 and 84 are amended to correct antecedent basis and to correct claim language within the Markush group.

Claim 83 is amended to incorporate the specific compounds recited in claim 80 in the method for the production of the blocking reagent according to claim 79. Support may be found in previously presented claim 80 as well as paragraph [0032], which recites,

> "In another embodiment of the sensor surface of the present invention, the blocking reagent is selected from among casein, hydrolyzed casein, a surfactant, bovine serum albumin, fetal calf serum, newborn calf serum, and mixtures thereof. These blocking reagents are available commercially, and for example may be purchased from Sigma-Aldrich Chemicals GmbH."

Claim 86 is amended to recite, "Use of a blocking reagent comprising at least one photoreactive group for covalent immobilization on a sensor surface in a method for producing a sensor surface." Support for the amendment may be found throughout the specification as originally filed. Specific support is provided in paragraph [0005], which recites,

> "This problem is solved by the present invention through the provision of a sensor surface with covalently-immobilized, specific probe molecules for at least one biomolecule to be detected, where, in principle, the positions on or regions of the sensor surface that are available for nonspecific binding are inactivated by at least one blocking reagent covalently immobilized thereon."

Further support may be found in paragraph [0011], which recites, "Another aspect of the present invention relates to a blocking reagent that possesses at least one photoreactive group for covalent immobilization to a sensor surface."

Claim 86 is also amended to clarify the probe molecules are capable of specific interaction with at least one biomolecule to be detected. Support may be found in paragraph [0027], which recites, "In an additional embodiment of the sensor surface of the present invention, the probe molecule (receptor) is a partner in a specific interaction system of complementary binding partners (receptor/ligand)."

Claim 86 is also amended from "covalent immobilization of the blocking reagent comprising at least one photoreactive crosslinker with at least one photoreactive group" to "covalent immobilization of the blocking reagent" to correct antecedent basis within the amended claim.

Claim 86 is also amended to correct antecedent basis for "at least one blocking reagent."

Claims 87-91 have been amended to properly depend from amended claim 86. Claim 87 is also amended to correct Markush group language.

I.
Restriction Requirement

The Examiner has issued the present restriction requirement based on the reasoning that the present application contains multiple inventions or groups of inventions that are not so linked as to form a single general inventive concept under PCT Rule 13.1. The Examiner has identified the following 5 groups contained within the present application and requires the election of a single group of claims:

Group	Claim Nos.	Description
I	60-75, 77 and 78	A sensor surface comprising the special technical feature of covalently-immobilized specific probe molecules
II	76	A method comprising the special technical feature of detecting the presence of analytes in a sample
III	79-82	A blocking reagent comprising the special technical feature of at least one photo-reactive group
IV	83 and 84	A method comprising the special technical feature of production of a blocking reagent
V	86-91	A method comprising the special technical feature of covalent immobilization of probes and blocking reagents on a sensor surface

The Examiner argues the inventions categorized into Groups I-V do not relate to a single general concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features. Specifically, the Examiner alleges groups II, IV and V are drawn to methods that do not share a special technical relationship, and the application contains method and product claims to more than one of the combinations of inventions as set forth by 37 CFR § 1.475.

Election of Species Within Group I

The Examiner further alleges Group I contains claims directed to more than one species of the generic invention. The Examiner contends that the species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1 and each of the species comprise a separate invention under 35 U.S.C. § 121. However the Examiner indicates that if one of groups II-V is elected, no species election is required.

A. Applicant Elects the Invention Identified in Group III (claims 79-82) With Traverse and Requests the Rejoining of Groups III-V in the Present Application

For completeness Applicant elects the invention identified in Group III. Group III includes claims 79-82. This election is made with traverse. Since only Group I requires an election of species, no election of species is deemed necessary.

Applicant respectfully requests Groups III-V be rejoined in the present application on the basis that Groups III-V include a unifying special technical feature that provides a contribution over the state of the art, namely, Groups III-V include a blocking reagent having a photoreactive group for covalent immobilization to a sensor surface.

B. Applicant Reserves the Right to Pursue Nonelected Inventions in Later Filed Applications

Applicant cancels claims 60-78 and 85 in response to the present restriction requirement. Thus, Applicant reserves the right to pursue inventions contained therein in subsequent patent applications claiming priority to the present application including any divisional patent applications.

C. Standard of Review When Determining Unity of Invention Under PCT Rule 13.1

The Examiner alleges Groups III-V lack unity of invention under PCT Rule 13.1. PCT Rule 13.1 states, "The international application shall relate to one invention only or to a group of inventions so linked as to form a single general inventive concept ("requirement of unity invention")." Though the unity of invention requirement is expressly provided in PCT Rule 13.1, the circumstances in which this requirement is to be considered fulfilled is provided in PCT Rule 13.2. Under PCT Rule 13.2,

> "Where a group of inventions is claimed in one and the same international application, the requirement of unity of invention referred to in Rule 13.1 shall be fulfilled only when there is a technical relationship among those

> inventions involving one or more of the same or corresponding special technical features. The expression "special technical features" shall mean those technical features that define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art." (Emphasis added)

Determining whether there exists a "unity of invention" is not affected by the manner of claiming the invention(s). Under PCT Rule 13.3,

> "The determination whether a group of inventions is so linked as to form a single general inventive concept shall be made without regard to whether the inventions are claimed in separate claims or as alternatives within a single claim."

In view of the above cited PCT Rules, the Examiner must determine whether there is a technical relationship among Groups III-V involving one or more of the same or corresponding special technical features. Such determination can not be overly conclusory, but instead must involve a comparison between Applicant's claims and the state of the art. Thus the Examiner must a) analyze the invention and b) clearly indicate the differences between the identified groups of inventions. Only after this has been performed is it proper to object to the claims as lacking a unity of invention under PCT Rule 13.1. For the convenience of the Examiner, Applicant provides a discussion of the Cohen et al. reference as well as the unifying special technical feature that is provided in Applicant's Groups III-V, namely, a blocking reagent including a photoreactive group for covalent immobilization on a sensor surface.

D. Cohen et al. (US 2003/0207258) Disclose a System that Establishes Spatially Separated Receptive Areas and Blocking Areas of a Substrate Through the Combined Use of a Photoreactive Crosslinking Layer and Selective Masking of the Substrate

By requiring restriction of the present invention, the Examiner alleges Groups III, IV and V do not share a special technical feature over the state of the prior art. Specifically, the Examiner identifies the special technical feature of claims 79-82 (Group III) as at least one photoreactive group; the special technical feature of claims 83 and 84 (Group IV) as the production of a blocking agent; and the special technical feature of

claims 86-91 (Group V) as covalent immobilization of probes and blocking reagents on a sensor surface. In support, the Examiner provides Cohen et al (US 2003/0207258) as teaching a sensor surface with covalently immobilized specific probe molecules for at least one biomolecule to be detected (para. 14), wherein positions on the sensor not containing specific probe molecules are inactivated by at least one blocking reagent (para 16-17) and the blocking reagent comprises at least one photoreactive cross linker having at least one photoreactive group suitable for covalent attachment onto the sensor surface by irradiation (para. 16-17).

Before addressing the special technical feature shared by claims 79-84 and 86-91 (Groups III-V), Applicant provides a brief summary of the technology disclosed by Cohen et al. for proper comparison. As an overview, Cohen et al. provide a biosensor having a substrate member, a photoreactive crosslinking layer, a pattern of active receptive material areas, and a pattern of inactive blocking material areas. The pattern of receptive material areas and inactive blocking material areas are defined using a masking process to selectively shield portions of the photoreactive crosslinking layer during irradiation. Thus in Cohen et al. the photoreactive crosslinking layer is used in combination with a masking process to define the spatially distinct receptive material areas and blocking areas. Cohen et al. is provided in more detail below.

Cohen et al. require the use of selective masking in combination with a crosslinking layer to define the receptive areas and blocking areas of the substrate. Referring to paragraph [0030],

> "The present invention comprises, in broad terms, a process of defining an active pattern of analyte-specific receptive material on a substrate surface by photo-masking the substrate. A layer containing a photo-reactive crosslinking agent is first applied to a surface of the substrate member."

The first material, which is typically the receptive material but in the alternative can be the blocking material, is applied over the crosslinking layer. The substrate is then masked to define the receptive area of the substrate. More specifically, referring to paragraph [0031],

> "A generally uniform coating of the receptive material or the blocking material is then applied to the substrate surface over the crosslinking agent layer. A mask is placed over the substrate, and the mask and substrate combination is irradiated with an energy source specifically selected to

> activate the photo-reactive group of the crosslinking agent. In its basic form, the "mask" serves to shield at least one area or section of the substrate member from the irradiating energy source and to expose at least one adjacent section to the energy source." (Emphasis added)

The unmasked areas of the substrate are irradiated for selective binding of the first material. Specifically, irradiation activates the portion of the crosslinker that is exposed (or unshielded) by the mask. Referring to paragraph [0032],

> "As mentioned, the energy source is selected so that the reactive group of the exposed crosslinking agent is activated and thus attaches or crosslinks with the overlaying material (the receptive material or blocking material)." (Emphasis added).

After crosslinking the first material to the crosslinking layer, the mask is removed and the substrate is washed to remove unbound first material. Referring to paragraph [0033],

> "The receptive material or blocking material that was under the shielding areas of the mask (and thus not crosslinked with the crosslinking agent) is removed from the substrate in any suitable cleansing process, such as rinsing the substrate with water or buffer solution."

The second material, which is typically the blocking material but can in an alternative embodiment be the receptive material, is then added. The areas of the crosslinking layer that were previously shielded are then irradiated for binding to the second material. Referring to paragraph [0034],

> "A generally uniform layer of respective other material is then applied to the substrate member. For example, if the receptive material was applied to the substrate before the masking process, the blocking material is subsequently applied. Likewise, if the blocking material was first applied, the receptive material is subsequently applied. The substrate member is then exposed to the energy source a second time so as to activate the remaining crosslinking agent in the areas of the substrate member that were shielded by the mask in the masking process." (Emphasis added)

Thus in Cohen et al. the photoreactive crosslinking layer and masking technique are used in combination to selectively bind the receptive material and blocking material in designated areas. The receptive areas and blocking areas are defined through the use of selective shielding by the mask and are thus spatially distinct. In other words, the

masking permits the separation of receptive areas and blocking areas, each of which are bound to the photoreactive crosslinking layer.

In addition to selective masking, there is another important feature in Cohen et al. that should be specifically pointed out for comparison to Applicant's unifying special technical feature. In Cohen et al. the photoreactive crosslinking layer is activated by irradiation. Since the photoreactive crosslinking layer is activated and not the blocking material, there is little concern with respect to design of the blocking material and therefore the blocking material includes no special technical features. Referring to paragraph [0016],

> "These "different" molecules will serve, in essence, to fill in or block the regions on the substrate between the active receptor material areas and may be, for example, biomolecules that specifically do not have affinity for the analyte of interest. In general, any type of blocking material may be used for this purpose." (Emphasis added)

Therefore the state of the art as provided in Cohen et al. is to add a photoreactive crosslinking layer to the substrate and use selective masking of the substrate to define the receptive areas and blocking areas. These methods result in the spatially defined active receptor material areas and blocking areas.

E. Groups III (Claims 79-82), IV (Claims 83, 84) and V (Claims 86-91) Share the Special Technical Feature of a Blocking Agent Having at Least One Photoreactive Group for Immobilization to a Sensor Surface, Which Makes A Contribution Over the Use of a Photoreactive Crosslinking Layer in Combination With Selective Masking as Provided in Cohen et al.

Applicant's claims 79-84 and 86-91 incorporate the special technical feature of a blocking agent having at least one photoreactive group for covalent immobilization to a sensor surface. Specifically Applicant's claim 79, from which claims 80-84 depend, include the limitation, "wherein the blocking reagent has at least one photoreactive group for covalent immobilization on a sensor surface." Amended claim 86, from which claims 87-91 depend, recite "Use of a blocking reagent including at least one photoreactive

group for covalent immobilization on a sensor surface in a method for producing a sensor surface." Thus each claim within Groups III-V include the special technical feature of a blocking reagent including at least one photoreactive group for covalent immobilization on a sensor surface.

Applicant's unifying special technical feature provides a contribution over the state of the art. First, by providing the blocking reagent including a photoreactive group for covalent immobilization on a sensor surface, a mask is no longer required. In Cohen et al. the mask is required to selectively shield the photoreactive crosslinking layer because both the receptive material and blocking material bind to the same crosslinking layer. By shielding select regions, Cohen et al. define the receptive region. However, in Applicant's invention the detection region may also include the blocking reagent, which prevents or reduces nonspecific interactions within the detecting region of the sensor. The result is an improved signal to noise ratio.

Second, by providing the blocking reagent including a photoreactive group for covalent immobilization to the sensor surface, a crosslinking layer is no longer necessary. In other words, in Applicant's invention the blocking reagent contains the photoreactive group and can covalently attach to the substrate without such a photoreactive crosslinking layer. Elimination of such a key step yields a significant contribution over the state of the art.

In view of the above analysis, Applicant has demonstrated Groups III-V share a special technical feature that provides a contribution over the state of the art as demonstrated by Cohen et al. Applicant respectfully requests the restriction of Groups III-V be withdrawn.

F. ISR and IPER Indicates the Claims of Parent PCT Patent Application PCT/DE2003/002452 Include a Single Unifying Technical Feature

Although the present U.S. national phase application was examined for restriction purposes only, the determination conflicts with the Receiving Office that examined the parent PCT patent application (PCT/DE2003/002452).

During the PCT process, the Receiving Office/Search Authority determines whether there is a lack of unity of invention under PCT Rule 13.1. The parent PCT patent application was reviewed; however, no such objections were made. Moreover the claims were found to be novel and include an inventive step over the prior art. Such a determination weighs in favor of Applicant's position that Groups III-V share a special technical feature that provides a contribution over the state of the art.

G. Conclusion

Applicant respectfully requests Groups III-V be rejoined and respectfully submit all claims are in condition for allowance.

Respectfully submitted,

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